C H A P T E R 3

Terminal Service Connections

This chapter describes how to connect a client terminal or microcomputer running terminal-emulation software such as Telnet, rlogin, TN3270, and Local Area Transport (LAT) through one of our server products to a host across a LAN or WAN. Specifically, this chapter contains the following sections:

- LAT Connections
- LPD Protocol Support
- Telnet and UNIX rlogin Connections
- TN3270 Connections
- Asynchronous Host Roaming

LAT Connections

The Digital Equipment Corporation (Digital) Local Area Transport (LAT) protocol is most often used to connect server products to Digital hosts. LAT is a Digital-proprietary protocol, and your server product uses LAT technology licensed from Digital to perform the following LAT connection tasks described in the following sections:

- Make a LAT Connection
- Define a Group Code List for Outgoing LAT Connections
- Switch between Sessions
- Use Digital Commands on the Server
- Exit a LAT Session

Make a LAT Connection

To connect to a LAT host, enter the **lat** EXEC command at the system prompt. The **lat** command has the following syntax:

> **lat** *name* [**node** *nodename* | **port** *portname* | **/debug**]

Syntax Description

lat *name*	Your LAT-learned service name.
node *nodename*	(Optional) Specifies a connection to a particular LAT node that offers a service. If you do not include the node name option, the node with the highest rating offering the service is used. Use the EXEC command **show lat nodes** to display information about all known LAT nodes.
port *portname*	(Optional) Specifies a destination LAT port name. This keyword is ignored in most timesharing systems, but is used by server products offering *reverse LAT* services. Reverse LAT involves connecting to one server product from another. In this case, the target server product runs the host portion of the protocol. Enter the port name in the format of the remote system in place of the *portname* argument.
/debug	(Optional) A switch that, when enabled, prints parameter changes and other special messages on the screen.

You can quit the connection by pressing Ctrl-C, or complete the connection by entering the password for a given service.

If your preferred transport is set to **lat**, you can use the **connect** command in place of the **lat** command. Refer to the *Access and Communication Server Configuration Guide* for more information about configuring a preferred transport type. When your preferred transport is set to **none** or to another protocol, you must use the **lat** command to connect to a LAT host.

Examples

The following example establishes a LAT connection from the communication server named cs to host eng2:

```
cs> lat eng2
Trying ENG2...Open
        ENG2 – VAX/VMS V5.2
Username: JSmith
Password:
    Welcome to VAX/VMS version V5.2 on node ENG2
    Last interactive login on Friday,  1-APR-1994 19:46
```

The system informs you of its progress by displaying the messages "Trying <system>..." and then "Open." If the connection attempt is not successful, you receive a failure message.

The following example establishes a LAT connection from the communication server named cs to our-modems and specifies port 24, which is a special modem:

```
cs> lat our-modems port 24
```

The following example establishes a LAT connection from the communication server named cs to our-modems and specifies a node named eng:

```
cs> lat our-modems node eng
```

The following example uses the LAT session debugging capability:

```
cs> lat Eng2 /debug
Trying ENG2...Open
        ENG2 – VAX/VMS V5.2
 Username: JSmith
 Password:
    Welcome to VAX/VMS version V5.2 on node ENG2
```

```
    Last interactive login on Tuesday, 5-APR-1994 19:02
[Set Flow out off, Flow in on, Format 8:none, Speed 9600/9600]
[Set Flow out off, Flow in on, Format 8:none, Speed 9600/9600]
$ set ter/speed=2400
[Set Flow out off, Flow in on, Format 8:none, Speed 2400/2400]
```

A variety of LAT events are reported, including all requests by the remote system to set local line parameters. The messages within brackets ([ ]) above are the messages produced by the remote system setting line characteristics to operating system defaults.

Define a Group Code List for Outgoing LAT Connections

You can temporarily define the list of services to which you or another user can connect. You do this by defining the group code lists used for connections from specific lines.

You limit the connection choices for an individual line by defining the group code lists for an outgoing connection. When a user initiates a connection with a LAT host, the user's line must share a common group number with the remote LAT host before a connection can be made.

The group code range entered *must be* a subset of the line's configured group code range. Use the following command:

terminal lat out-group {*groupname* | *number* | *range*}

Syntax Description

groupname   Name of the group that has access to the system through the specified line.

number   Number of the group that has access to the system through the specified line.

range   The range of group numbers. Separate the beginning and end of the range with a hyphen.

The group code range entered in this command must fall within the group code range already configured for the line.

Example

```
cs> terminal lat out-group 4, 6-189
```

Switch between Sessions

You can have several concurrent LAT sessions open and switch back and forth between them.

To open a subsequent session, first enter the escape sequence (**Ctrl-^ X**) to quit the current session. Then open a new session.

To list the available LAT services, issue the following command:

show lat services

For sample output to this command, and for information about switching between LAT sessions, refer to the chapter "Monitoring and Managing Connections" later in this publication.

Use Digital Commands on the Server

Your server product supports a subset of Digital commands, including the following:

Task	Command
List EXEC commands.	**help**
Close the active session.	**logout**

Exit a LAT Session

You can issue any of the following commands to terminate an active LAT session:

exit
quit
logout

LPD Protocol Support

The Berkeley UNIX Line Printer Daemon (LPD) protocol is used to send print jobs between UNIX systems. The access server and communication server support a subset of the LPD protocol that provides the following features:

- Improved status information

- Cancellation of printer jobs

- Confirmation of successful printing and automatic retry for common failure cases

- Use of standard UNIX software

Support for the LPD protocol allows you to display a list of currently defined printers and current usage statistics for each printer.

To provide access to LPD features, your system administrator must configure a printer and assign a tty line (or lines) to the printer. The administrator must also modify */etc/printcap* on your UNIX system to include the definition of the remote printer on the access or communication server. Refer to the *Access and Communication Server Configuration Guide* and *Access and Communication Server Command Reference* for additional information.

To show a list of currently defined printers and current usage statistics for each printer, enter the following command:

show printer

Telnet and UNIX rlogin Connections

Two Transmission Control Protocol/Internet Protocols (TCP/IP), Telnet and rlogin, enable connections to a host.

Telnet, a virtual terminal protocol that is part of the TCP/IP protocol suite, is the more widely used protocol.

The rlogin protocol is a remote login service developed for the BSD UNIX system. It provides better control and output suppression than Telnet, but can only be used when the host (typically, a UNIX system) supports rlogin. Our implementation of rlogin does not subscribe to the trusted host model. That is, a user cannot automatically log on to a UNIX system from the server product, but must provide a user ID and a password for each connection.

This implementation of Telnet and rlogin provides the connection capabilities described in the following sections:

- Make Telnet Connections
- Execute Special Telnet Escape Sequences
- Make rlogin Connections
- Switch between Telnet and rlogin Sessions
- Exit Telnet and rlogin Sessions

Make Telnet Connections

To log on to a host that supports Telnet, enter one of the following commands:

connect *host* [*port*] [*keyword*]

telnet *host* [*port*] [*keyword*]

Syntax Description

host   A host name or an Internet address.

port   (Optional) A decimal TCP port number; the default is the Telnet server product port (decimal 23) on the host.

keyword   (Optional) One of the options listed in Table 3-1.

Table 3-1   Telnet Connection Options

Option	Description
/route *path*	Specifies loose source routing. The *path* argument is a list of host names or Internet addresses that specify network nodes, ending with the final destination.
/line	Enables Telnet line mode. In this mode, the server product sends no data to the host until you press Return. You can edit the line using the standard server product command editing characters. The **/line** keyword is a local switch; the remote server product is not notified of the mode change.
/debug	Enables Telnet debugging mode.
/stream	Turns on *stream* processing, which enables a raw TCP stream with no Telnet control sequences. A stream connection does not process Telnet options, and can be appropriate for connections to ports running UUCP and other non-Telnet protocols.

With the Cisco implementation of TCP/IP, you are not required to enter the **connect** or **telnet** commands to establish a Telnet connection. You can just enter the learned host name—as long as the host name is different from a command word for the server product.

To display a list of the available hosts, enter the following command:

show hosts

To display the status of all TCP connections, enter the following command:

show tcp

The server product assigns a logical name to each connection, and several commands use these names to identify connections. The logical name is the same as the host name, unless that name is already in use, or you change the connection name with the EXEC command **name-connection**. If the name is already in use, the server product assigns a null name to the connection.

Examples

The following example routes packets from the source system mathon to kl.sri.com, then to 10.1.0.11, and finally back to mathom:

```
cs> connect mathom /route:kl.sri.com 10.1.0.11 mathom
```

The following example connects to a host with logical name mathom:

```
cs> mathom
```

Execute Special Telnet Escape Sequences

The Telnet software supports special Telnet commands in the form of Telnet sequences that map generic terminal control functions to operating system-specific functions.

To issue a special Telnet command, enter the escape sequence and then a command character. The default escape sequence is Ctrl-^ (press and hold the Control and Shift keys while pressing the 6 key). You can enter the command character as you hold down Ctrl or with Ctrl released; you can type either uppercase or lowercase letters.

Table 3-2 lists the special Telnet commands.

Table 3-2   Special Telnet Commands

Task	Escape Sequence
Break	**Ctrl-^ B**
Interrupt Process (IP)	**Ctrl-^ C**
Erase Character (EC)	**Ctrl-^ H**
Abort Output (AO)	**Ctrl-^ O**
Are You There? (AYT)	**Ctrl-^ T**
Erase Line (EL)	**Ctrl-^ U**

At any time during an active Telnet session, you can list the Telnet commands by pressing the escape sequence keys followed by a question mark at the system prompt:

Ctrl-^ ?

A sample of this list follows.

```
cs> ^^?
[Special telnet escape help]
^^B  sends telnet BREAK
^^C  sends telnet IP
^^H  sends telnet EC
^^O  sends telnet AO
^^T  sends telnet AYT
^^U  sends telnet EL
```

Make rlogin Connections

You can have several concurrent rlogin connections open and switch back and forth between them.

To open a new connection, exit out of the current connection by typing the escape sequence (Ctrl-^ X), to return to the system command prompt, then open a new connection.

To log on to a UNIX host using rlogin, enter the following command:

rlogin *host [debug]*

Syntax Description

host   Specifies the host name or Internet address.

debug   (Optional) Enables debugging output from the rlogin protocol.

Example

The following example makes an rlogin connection to a host at address 108.33.21.2 and enables the message mode for debugging:

```
cs> rlogin 108.33.21.2 debug
```

Switch between Telnet and rlogin Sessions

You can have several concurrent sessions open and switch back and forth between them. The number of sessions that can be open is defined by the **session-limit** command, which is described in the publications *Access and Communication Servers Configuration Guide* and *Access and Communication Servers Command Reference*.

You can switch between sessions by escaping one session and resuming a previously opened session, as follows:

Step 1   Escape out the current session by pressing **Ctrl-^ X** and return to the EXEC prompt.

Step 2   List the open sessions using the **where** command. All open sessions associated with the current terminal line are displayed.

Step 3   Type the **resume** command and the session number to make the connection.

You can also resume the previous session by pressing the Return key.

The **where** command has no additional syntax. The **resume** command has the following syntax when used on the server product:

resume [*connection*] [*keyword*]

Syntax Description

connection	(Optional) The name or number of the connection; the default is the most recent connection.
keyword	(Optional) One of the options listed in Table 3-3.

Table 3-3   Telnet and rlogin Resume Options

Option	Description
/debug	Prints parameter changes and messages. On a server product, this option displays informational messages whenever the remote host changes an X.3 parameter or sends an X.29 control packet.
/echo	Performs local echo.
/line	Enables line-mode editing.
/nodebug	Cancels printing of parameter changes and messages.
/noecho	Disables local echo.
/noline	Disables line mode and enables character-at-a-time mode, which is the default.
/nostream	Disables stream processing.
/set *parameter:value*	Sets X.3 connection options. Refer to the "X.3 PAD Connections" section in the "Terminal or Telecommuting Service Connections Using Protocol Translation" chapter for a list of these connection options.
/stream	Enables stream processing.

The **Ctrl**-**^**-**X**, **where**, and **resume** commands are available with all supported connection protocols.

Examples

The following example shows how to escape out of a connection to the host Swift and to resume connection 2:

```
Swift% ^^X
cs> resume 2
```

You can omit the command name and simply type the connection number to resume that connection. The following example illustrates how to resume connection 3:

```
cs> 3
```

Exit Telnet and rlogin Sessions

You can issue any of the following commands to terminate an active Telnet or rlogin session:

exit
quit
logout

TN3270 Connections

You use TN3270 terminal emulation to connect to an IBM host. Your system administrator must configure a default terminal emulation file that permits the terminal to communicate correctly with the host. Refer to the publications *Access and Communication Servers Configuration Guide* and *Access and Communication Servers Command Reference* to specify alternate terminal emulations. Your administrator can also specify custom terminal emulations.

Unlike Telnet and LAT connections, you *must* enter the command **tn3270** to make a connection to an IBM 3278 host. To begin a TN3270 session, enter the following command:

tn3270 *hostname*

Syntax Description

hostname　　　　　Name of a specific host on a network that can be reached by the server product. The default terminal emulation mode allows access using a VT100 emulation.

Example

The following example establishes a terminal session with an IBM host named "finance:"

```
cs> tn3270 finance
```

To terminate an active TN3270 session, you can issue any of the following commands:

exit
quit
logout

Asynchronous Host Roaming

If you are a mobile user, it is often impractical to dial into your "home" access or communication server from a remote site. Asynchronous host roaming allows you to dial into different server products elsewhere on the internetwork while experiencing the same server environment that you would if you were connecting directly to your "home" access or communication server.

This host mobility is accomplished by packet "tunneling," a technique by which raw data from the dial-in user is encapsulated and transported directly to the host site where your "home" communication server performs the actual protocol processing.

You enable asynchronous host roaming by entering the **tunnel** command to set up a network layer connection to a specified host. This task is described in the following section.

Once the connection is established, you will see an authentication dialog or prompt from your "home" access or communication server and can proceed as if you are connected directly to that server. When communications are complete, the network connection can be closed and terminated from either end of the connection.

To set up a network layer connection to an access or communication server, enter the following command:

tunnel *hostname*

Syntax Description

hostname   Name of a specific host on a network that can be reached by the server.

Example

The following example establishes a network layer connection with an IBM host named "mktg:"

```
cs> tunnel mktg
```